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EXAMINER

YAMNITZKY, MARIE ROSE

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| ART UNIT | PAPER NUMBER |
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1774

DATE MAILED: 03/12/2003

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Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

09/978,455

Applicant(s)

LAMANSKY ET AL.

Examiner

Marie R. Yamnitzky

Art Unit

1774

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 10/16/01 & four later filed IDS's.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-30 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-30 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☒ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on _____ is: a) ☐ approved b) ☐ disapproved by the Examiner.
- If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

- 13) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.
- 14) ☒ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
- a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☒ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO-1449) Paper No(s) 4-7.
- 4) ☐ Interview Summary (PTO-413) Paper No(s). _____.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: _____.

1. Applicant has not complied with one or more conditions for receiving the benefit of an earlier filing date under 35 U.S.C. 119(e) and 120 as follows:

An application in which the benefits of an earlier application are desired must contain a specific reference to the prior application(s) in the first sentence of the specification or in an application data sheet (37 CFR 1.78(a)(2) and (a)(5)). The specific reference to any prior nonprovisional application must include the relationship (i.e., continuation, divisional, or continuation-in-part) between the applications except when the reference is to a prior application of a CPA assigned the same application number.

2. The disclosure is objected to because of the following informalities:

The first page of the specification does not reference the applications for which priority is claimed under 35 U.S.C. 119(e) and 35 U.S.C. 120.

Appropriate correction is required.

3. Claims 1-30 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

The scope of a "heavy" transition metal as required by at least claims 1, 5-8 and 10-27 is not clear. It is not clear if a "heavy" transition metal is limited to a transition metal having an atomic number of at least 72 as taught in the first paragraph of page 16 of the specification, or if

Art Unit: 1774

transition metals such as Ru, Rh and Pd which each have an atomic number less than 72 are usable.

The limitation imposed by the requirement for “efficient” phosphorescent emission as recited in claims 1 and 27 is not clear. It is not clear what constitutes “efficient” emission. It is also not clear whether the efficient emission can be produced by any combination of heavy transition metal and ligand(s) that provide a mixture of metal-to-ligand charge transfer and π - π^* ligand states, or if the efficient emission must be produced by the organometallic compound having the ligands specified in claims 1 and 27.

The limitation imposed by the requirement for a “well defined” vibronic structure as recited in claims 1 and 27 is not clear. It is not clear what constitutes a “well defined” structure.

The requirements for the organometallic compound as set forth in claims 3, 4, 29 and 30 are not clear. Each of these claims initially describes the organometallic compound in broad terms as comprising a heavy transition metal and two types of ligands. After the broad description, claims 3 and 29 set forth a Markush group of formulae for the chemical structure of the compounds, and claims 4 and 30 set forth a single formula for the compound. It is not clear if the organometallic compound required by claims 3, 4, 29 and 30 (and any claim dependent therefrom) is limited to the narrower “range” of compounds (i.e. compounds of the specified formulae) or to the broader “range” (i.e. the generic description of the metal and two ligands).

Claims 5 and 9 are incomplete in defining “X=S, O, NR” but never defining “R” of “NR”.

Claims 5 and 9 are confusing in allowing R₁-R₅ to represent a divalent group (“arylene”).

Art Unit: 1774

The definitions of R'_1 and R'_2 as set forth in claims 5 and 9 are rendered indefinite by the term "may". It is not clear what, if anything, R'_1 and R'_2 may be other than aryl.

The definitions of X and E for one of the possible non-monoanionic, bidentate, carbon-coordination ligands as set forth in claims 7 and 9 appear to be reversed. Otherwise, an improper number of bonds is provided between the group or atom represented by these variables and the remainder of the formula containing X and E.

4. Regarding claim interpretation:

Because one of the possibilities set forth in claims 5, 7 and 9 for various R variables is hydrogen, the claims are interpreted as allowing for multiple occurrences of the R variables. For example, the second formula in claim 5 is interpreted as allowing for four R_1 and for four R_2 , each of which independently represents hydrogen, halogen, alkyl or aryl.

Absent a clear definition of "heavy transition metal", "efficient phosphorescent emission" and "well defined vibronic structure", the examiner will consider that at least any organometallic compound comprising a metal selected from Os, Ir, Pt and Au, at least one ligand selected from those set forth in claims 5 and 6, and at least one ligand selected from those set forth in claims 7 and 8 meets the limitations of the organometallic compound required by present claims 1 and 27.

5. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

Art Unit: 1774

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

6. Claim 29 is rejected under 35 U.S.C. 102(b) as being anticipated by Cockburn et al. in *Journal of the Chemical Society. Dalton Transactions*, Vol. 4 (1973), pp. 404-410.

Cockburn et al. disclose an organometallic compound having a chemical structure represented by the third platinum-containing formula shown in claim 29 (the fifth formula from the end of claim 29). See Table 5 on p. 409: "(bq)Pt(acac)".

7. Claims 1-5, 7-9 and 27-30 are rejected under 35 U.S.C. 102(e) as being anticipated by Igarashi et al. (US 2001/0019782 A1).

Claims 3, 4, 29 and 30 are included in this rejection subject to clarification as to whether these claims are limited to compounds having formulae of the formulae shown in these claims, or to compounds within the broader description that precedes the formulae. Igarashi et al. anticipate compounds within the broader description.

See the whole published application. In particular, see formulae (1-18), (1-34), (1-35), (1-40), (1-45), (1-47), (1-48), (1-63), (1-64), (1-66), (1-69), (2-2), (2-6) and (2-8).

A compound represented by formula (1-18), for example, is an organometallic compound comprised of the heavy transition metal Ir, two mono-anionic bidentate, carbon-coordination

Art Unit: 1774

ligands each substituted with an electron donating substituent, and one non-mono-anionic, bidentate, carbon-coordination ligand. Each of the two mono-anionic bidentate, carbon-coordination ligands is represented by the second formula shown in present claims 5 and 9 wherein each R_2 is hydrogen and one R_1 is alkyl (the others being hydrogen). The non-mono-anionic bidentate, carbon-coordination ligand is represented by the sixteenth formula shown in present claim 7 (and corresponding formula in present claim 9) wherein each R_1 and R_2 is hydrogen, which is the same as the ninth formula shown in present claim 8.

As another example, a compound represented by formula (1-45) is an organometallic compound comprised of the heavy transition metal Ir, two mono-anionic bidentate, carbon-coordination ligands each substituted with an electron donating substituent, and one non-mono-anionic, bidentate, carbon-coordination ligand. Each of the two mono-anionic bidentate, carbon-coordination ligands is represented by the second formula shown in present claim 5 wherein each R_2 is hydrogen and one R_1 is aryl (the others being hydrogen). The non-mono-anionic bidentate, carbon-coordination ligand is represented by the first formula shown in present claim 8.

As further examples, compounds represented by formula (2-2), (2-6) or (2-8) are organometallic compounds comprised of the heavy transition metal Ir, two mono-anionic bidentate, carbon-coordination ligands each substituted with an electron donating substituent, and one non-mono-anionic, bidentate, carbon-coordination ligand. Each of the two mono-anionic bidentate, carbon-coordination ligands is represented by the last formula shown in present claim 5 wherein each of R_2 and R_3 is hydrogen and one R_1 is alkyl and the others are hydrogen in the case of the compound represented by formula (2-2) or (2-8), or one R_1 is aryl

and the others are hydrogen in the case of the compound represented by formula (2-6). The non-mono-anionic bidentate, carbon-coordination ligand is represented by the first formula shown in present claim 8.

8. Claims 1-5 and 27-30 are rejected under 35 U.S.C. 102(e) as being anticipated by Grushin et al. (US 2002/0121638 A1).

Claims 4 and 30 are included in this rejection subject to clarification as to whether these claims are limited to compounds having formulae of the formulae shown in these claims, or to compounds within the broader description that precedes the formulae. Grushin et al. anticipate compounds within the broader description.

See the whole published application. In particular, see paragraphs [0008]-[0050].

Compound 1-s (Table 1) is a compound represented by the eleventh formula set forth in present claims 3 and 29 (but not within the scope of any of the other present claims because this compound does not comprise at least one non-mono-anionic, bidentate, carbon-coordination ligand).

The compound represented by formula (X) (page 4), for example, is an organometallic compound comprised of the heavy transition metal Ir, two mono-anionic bidentate, carbon-coordination ligands each substituted with two electron withdrawing substituents, and one non-mono-anionic, bidentate, carbon-coordination ligand. Each of the two mono-anionic bidentate, carbon-coordination ligands is represented by the second formula shown in present claim 5.

9. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

10. Claims 1-30 are rejected under 35 U.S.C. 103(a) as being unpatentable over Igarashi et al. (US 2001/0019782 A1) as applied to claims 1-5, 7-9 and 27-30 above or as being unpatentable over Grushin et al. (US 2002/0121638 A1) as applied to claims 1-5 and 27-30 above, and for the further reasons set forth below.

Each of the primary references (i.e. Igarashi et al. and Grushin et al.) suggest a variety of organometallic iridium compounds within the scope of the present claims. The organometallic iridium compounds are disclosed for use in the light emitting layer of an organic light emitting device and may be used in combination with other compounds. It would have been *prima facie* obvious to one of ordinary skill in the art at the time of the invention to make organometallic iridium compounds suggested by either of the primary references other than the specific organometallic iridium compounds disclosed by the prior art. One of ordinary skill in the art would have been motivated to make other compounds within the scope of either of the primary references in order to provide specific compounds in addition to those explicitly disclosed by the prior art that would be suitable for use in an organic light emitting device. One of ordinary skill in the art would have recognized from the disclosure of either of the primary references that

Art Unit: 1774

properties such as color of light emission could be influenced by the selection of specific ligands/specific substituents on the ligands.

With respect to the subject matter of present claims 10-26, it would have been within the level of ordinary skill of a worker in the art at the time of the invention to determine suitable and optimum combinations of host material and organometallic compound. One of ordinary skill in the art at the time of the invention would have been motivated to select particular combinations of host material and organometallic compound in order to optimize the transfer of energy from the host material to the organometallic compound and in order to observe light emission from the organometallic compound.

11. The nonstatutory double patenting rejection is based on a judicially created doctrine grounded in public policy (a policy reflected in the statute) so as to prevent the unjustified or improper timewise extension of the "right to exclude" granted by a patent and to prevent possible harassment by multiple assignees. See *In re Goodman*, 11 F.3d 1046, 29 USPQ2d 2010 (Fed. Cir. 1993); *In re Longi*, 759 F.2d 887, 225 USPQ 645 (Fed. Cir. 1985); *In re Van Ornum*, 686 F.2d 937, 214 USPQ 761 (CCPA 1982); *In re Vogel*, 422 F.2d 438, 164 USPQ 619 (CCPA 1970); and, *In re Thorington*, 418 F.2d 528, 163 USPQ 644 (CCPA 1969).

A timely filed terminal disclaimer in compliance with 37 CFR 1.321(c) may be used to overcome an actual or provisional rejection based on a nonstatutory double patenting ground provided the conflicting application or patent is shown to be commonly owned with this application. See 37 CFR 1.130(b).

Effective January 1, 1994, a registered attorney or agent of record may sign a terminal disclaimer. A terminal disclaimer signed by the assignee must fully comply with 37 CFR 3.73(b).

12. Claims 3 and 29 are provisionally rejected under the judicially created doctrine of obviousness-type double patenting as being unpatentable over claims 9 and 12 of copending Application No. 09/637,766. Although the conflicting claims are not identical, they are not

Art Unit: 1774

patentably distinct from each other because the present claims are generic for the subject matter of the copending claims.

Copending claim 9 is drawn to an organic light emitting device comprising an organometallic compound selected from a Markush group consisting of the seven platinum-containing formulae set forth in present claims 3 and 29. Copending claim 12 is drawn to an organometallic compound and sets forth a Markush group consisting of the seven platinum-containing formulae set forth in present claims 3 and 29.

This is a provisional obviousness-type double patenting rejection because the conflicting claims have not in fact been patented.

13. Claims 1, 2, 5, 8, 27 and 28 are provisionally rejected under the judicially created doctrine of obviousness-type double patenting as being unpatentable over claims 53-64 and 117-128 of copending Application No. 09/981,496. Although the conflicting claims are not identical, they are not patentably distinct from each other because the present claims are generic for the subject matter of the copending claims.

Copending claims 53-64 are drawn to a compound of a specified formula. Copending claims 117-128 are drawn to an organic light emitting device comprising a compound of the same formula as in copending claims 53-64. The compound is an organometallic compound consisting of the heavy transition metal Ir, two mono-anionic bidentate, carbon-coordination ligands, and one non-mono-anionic, bidentate, carbon-coordination ligand. Each of the two mono-anionic bidentate, carbon-coordination ligands are substituted with at least one electron

Art Unit: 1774

donating substituent or at least one electron withdrawing substituent. The non-mono-anionic bidentate, carbon-coordination ligand is represented by the first formula shown in present claim 8. Each of the two mono-anionic bidentate, carbon-coordination ligands of the specific compound claimed in copending claim 54, for example, is represented by the last formula shown in present claim 5 wherein each of R_2 and R_3 is hydrogen and one of R_1 is halogen (the others being hydrogen).

This is a provisional obviousness-type double patenting rejection because the conflicting claims have not in fact been patented.

14. Miscellaneous:

In line 7 of claim 29, "form" should read --from--.

15. The references made of record and not relied upon are considered pertinent to applicants' disclosure.

US 2002/0024293 A1, which is the pre-grant publication of application 09/905,996 (filed 07/17/01) discloses compounds represented by the eleventh and thirteenth formulae shown in present claims 3 and 29. See formulae (K-3) on page 6 and formula (K-9) on page 7. In view of the fact that the compounds represented by the eleventh and thirteenth formulae of present claims 3 and 29 are supported by provisional application 60/283,814 (filed 04/13/01) but are not supported by copending application 09/637,766 (filed 08/11/00), the effective U.S. filing dates

Art Unit: 1774

for this subject matter in these two noncommonly owned applications is about three months apart.

US 2002/0190250 A1 is related to US 2002/0121638 A1 (applied above) and discloses additional organometallic iridium compounds not disclosed in the earlier '638 publication but within the scope of the present claims. Based on effective U.S. filing dates, the '250 publication is not available as prior art with respect to these additional iridium complexes.

16. Any inquiry concerning this communication should be directed to Marie R. Yamnitzky at telephone number (703) 308-4413. The examiner works a flexible schedule but can generally be reached at this number from 6:30 a.m. to 4:00 p.m. Monday, Tuesday, Thursday and Friday, and every other Wednesday from 6:30 a.m. to 3:00 p.m.

The current fax numbers for Art Unit 1774 are (703) 872-9311 for official after final faxes and (703) 872-9310 or (703) 305-5408 for all other official faxes. (Unofficial faxes to be sent directly to examiner Yamnitzky can be sent to (703) 872-9041.)

MRY
03/10/03



MARIE YAMNITZKY
PRIMARY EXAMINER

1774